Energy Briefs

Helping You Live Energy Efficiently!

Affordable Energy Efficient Housing

Energy efficiency pays! The annual energy bill for a newly constructed, affordable home averages over $1,300. Increasing the energy efficiency of the home saves over $400 a year and adds less than $500 to construction costs.

Cutting Energy Waste Saves Money and Builds Community Wealth

Low income families may spend over 15 percent of their income on energy to operate their homes. Simple energy efficiency improvements can cut energy costs by over 40 percent in most affordable housing. The money that families save on energy can help them pay for food, clothing and other essentials.

Protect the Health of Families and the Environment

All homes should provide a healthy indoor environment. Poor energy features can contribute to serious health concerns especially for children, the elderly, and those suffering from illness. Energy efficient homes reduce health risks from mold, dust mites, radon, combustion by-products, and other contaminants. They offer fewer entry points for dust and pollen, insects, rodents and other pests.

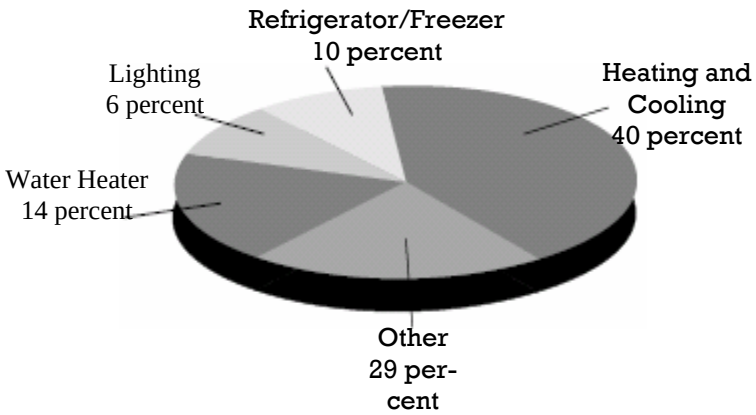
Homes are not often thought of as causing pollution, but the electricity and fossil fuels they use contribute to global warming, acid rain, smog and other serious environmental problems. Wasted energy needlessly pollutes the environment. Energy efficient homes protect the planet as well as the pocketbooks of homeowners.

Affordable for the Future

To be affordable, housing must be designed and constructed to last and not require expensive maintenance. Energy efficient construction improves building durability by reducing moisture related problems. When families spend less on energy bills, they can better budget for maintenance and repairs.

While energy efficiency may modestly increase construction cost, it will help ensure that a house built today will be decent, safe and affordable in the future.

Average Home Energy Use



Average Household Energy Expenditures

The average American family spends $1,847 on home energy per year. Energy use varies according to home characteristics, occupant lifestyle, and climate.

Northeast.....$2,200
Midwest.....$2,053
South.....$1,670
West.....$1,465

*Based on information from www.energyhog.org

South Carolina Energy Office * 1201 Main Street, Suite 430 * Columbia, SC 29201
(803) 737-8030 * 1-800-851-8899 * Fax (803) 737-9846 * www.energy.sc.gov
SCEO is an office of the South Carolina Budget and Control Board

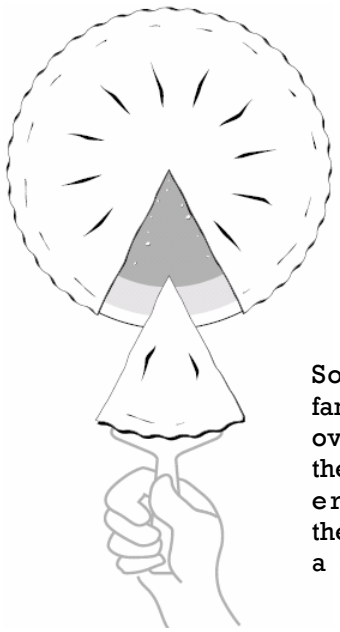
Energy Efficiency Makes Housing Rehab Affordable

In Greene County, Pennsylvania, the Habitat for Humanity (HFH) affiliate closely monitored energy usage for remodeled homes. They discovered annual energy bills as high as $1,800. The data clearly showed that the highest energy consumption occurred where little attention had been given to energy improvements to the building envelope and HVAC equipment.

By incorporating proper planning and quality control during remodeling, HFH successfully reduced air leakage in the building envelope and duct system and improved efficiencies of the insulation, water heater, and space conditioning equipment.

The results were significant: gas bills for heat and hot water dropped from between $60 to $110 per month to around $30. Electricity costs were reduced by improving lighting and certain "Energy Hog" appliances, such as old refrigerators and dryers. Improvements in water efficiency reduced water and sewage costs.

HFH has lowered energy use in older homes to about the same levels as for new, energy efficient homes. The key is a "systems" approach that considers all energy usage, including heating, cooling, hot water, lighting, and appliances. It is also critical to educate homeowners on how to operate their homes in an energy efficient manner.



Some low income families may spend over 15 percent of their income on energy to operate their homes -- that's a big piece of the

Energy Efficiency Means Quality and Affordability

Many energy features offer additional benefits such as increased comfort, reduced noise, and greater fire safety. Energy efficient homes also experience less condensation, which protects framing, windows and finish materials. Better control of moisture and temperature means less movement of materials which reduces floor squeaks and drywall cracks.

While some energy features add to construction costs, others can reduce costs. For example, increasing insulation and sealing air leaks reduce heating and cooling needs, allowing the use of smaller equipment and ductwork. The savings on the mechanical systems can pay for the increased cost of insulation and air sealing. Energy efficient framing techniques can reduce lumber costs over 15 percent and prevent mold growth in outside walls and ceilings.

Getting the most efficiency for the least cost requires careful attention throughout the design and construction process. Most energy efficient homes have dozens of small improvements that individually add little to construction cost, yet together yield big savings.

Energy Efficiency and Home Ownership

If home buyers pay less for energy, they can afford larger mortgages. Because energy efficient homes have lower and more stable utility costs, there is less risk of foreclosure. Some lenders may offer energy efficient mortgages which help offset any added construction costs due to energy improvements.

Energy efficiency is a great investment for home owners. When added to a mortgage, energy improvements usually cost less than the savings they offer on utility bills. Increasing the value of a home is a great investment -- paying high energy bills is not!

Energy Codes

Many states and local governments have mandatory residential energy codes. South Carolina now uses the 2006 IECC (International Energy Conservation Code) in place of the 2003 version. Federal housing programs require that designs started after January 3, 2007 comply with the 2004 IECC.

While energy codes set minimum standards, it is often wise to exceed code requirements to create a more efficient, healthy, durable, comfortable, and affordable home.

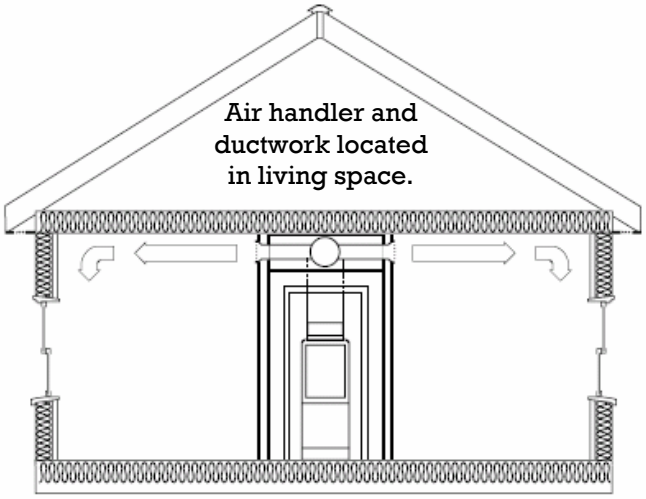
What Makes a Home Energy Efficient?
Increasing the energy efficiency of affordable homes doesn't need to make construction costs skyrocket nor require special materials or construction skills. However, cutting energy waste; ensuring occupant health, safety and comfort; and improving building durability does require careful planning, training and quality control during construction.

HVAC

Poor design and installation of heating, ventilation, and air conditioning (HVAC) equipment commonly increases energy costs 10 to 30 percent in affordable housing. This wastes money and can endanger the health of families. Proper design and installation of HVAC equipment is usually the top priority for cutting energy bills.

- **Equipment Size**

Equipment that is too big (excess capacity) costs more to buy and operate, and leads to poor comfort, excess noise, and greater pollution. Do not allow rules of thumb, such as so much heating or cooling per square foot of living area, to be used to determine equipment size. To size equipment, require exact calculations that consider insulation levels, window type and orientation, and air sealing measures. Calculating equipment size should take less than an hour for most affordable home designs, and will prevent the purchase of costly, oversized equipment and provide significant savings to home owners for years to come.



A Durham, N.C. affordable housing group locates ductwork in a hallway chase. The chase is sealed with drywall on all sides. The design reduces construction costs and saves energy.

- **Equipment Efficiency and Energy Source**

The professional that calculates the size of the HVAC equipment should also be able to determine estimated operating costs for various equipment efficiencies and energy sources. Smaller, high efficiency models may not cost considerably more than standard equipment. While future prices can vary, it is important to consider the cost of energy sources when selecting equipment. Saving a few dollars on equipment is no bargain if families will pay hundreds more because the equipment uses an expensive energy source.

- **Ventilation**

Today's homes need controlled ventilation. Relying on cracks in the building envelope to provide proper ventilation endangers health and safety. For most affordable home designs, simple, controlled ventilation systems can be economical to install and operate. In temperate climates, many affordable housing providers rely on upgraded bath fans and kitchen range hoods ducted to the outside. In more severe climates, heat recovery ventilation and other techniques may be practical.

- **Ductwork**

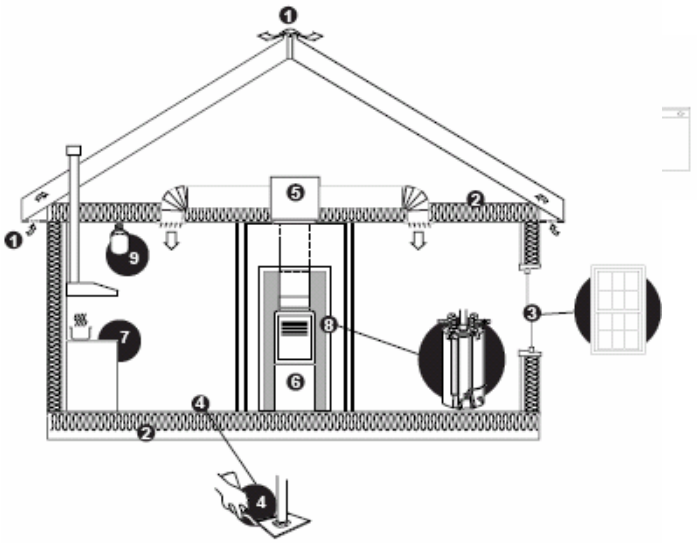
Improving the efficiency of ductwork is the single most important energy measure for most affordable homes!

Poor ductwork can waste hundreds of dollars each year and cause serious health and safety problems. It is best to locate ducts inside the living area -- not in attics or crawl spaces. Do not use building cavities, such as closet returns, as part of the duct system. Make sure all joints in the ductwork are sealed permanently with mastic, a thick paste that provides a durable seal for all types of duct. Duct tape does not provide an effective seal for ductwork. After ducts are sealed, ensure they have adequate insulation. The Model Energy Code sets minimums, but higher levels are often cost effective. Do not rely on insulation to seal ducts -- use mastic.

Tapes do not provide a lasting seal. Mastic is economical, easy to apply and provides a durable seal.

Improve Energy Efficiency Throughout the House

1. Ventilate attic
2. Install adequate insulation with no gaps or compressed areas
3. Specify efficient windows; consider orientation
4. Seal all penetrations
5. Locate ducts inside conditioned space; if not possible, ensure ducts are sealed with mastic and insulated
6. Size heating and cooling equipment; choose efficient models
7. Provide controlled ventilation
8. Install efficient water heating
9. Specify efficient lighting for fixtures used more than 4 hours daily
10. Choose efficient appliances



Air leakage

Excess air leakage in homes can increase heating and cooling bills by 30 percent and reduce fire safety. Although windows, doors and outside walls contribute to air leakage, the biggest holes are usually hidden from view and connect the house to the attic, crawl space, or basement. Reducing air leakage typically costs less than $200 for an average home and is required by the Model Energy Code.

Insulation

Affordable houses will not get the full benefits of their insulation if it is installed poorly. Gaps and compressed areas in the insulation can cut savings over 25 percent. Poor installation also leads to condensation and comfort problems. The Model Energy Code sets minimum requirements for insulation levels, but it is often cost effective to exceed these levels.

Water conservation

A family of four can spend more for hot water than heating or cooling. Consider the cost of various fuels for heating water as well as the efficiency of the water heater. Simple conservation measures, such as low-flow showerheads, tank insulation jackets, and convection traps in hot and cold water lines pay back quickly.

Windows

While energy efficient windows cost more than standard models, they can cut energy bills significantly and lower other construction costs. High performance windows can reduce heating and cooling needs enough to permit smaller, and cheaper, HVAC equipment and ductwork. The use of energy efficient windows greatly improves comfort by increasing surface temperatures and cutting drafts. They also reduce condensation which protects building materials and reduces mold growth.

Lighting

Energy efficient lighting saves on electric bills, helps keep the home cooler by reducing waste heat, and lasts longer. Specify compact or tubular fluorescents for interior fixtures that will be on for 4 hours or more each day - - usually kitchens, hallways, and some living areas. Energy efficient fluorescents provide excellent light quality and are long lasting. Their extra cost is repaid in energy savings.

Exterior security lighting can cost hundreds of dollars a year to operate if it is not energy efficient. Install only compact fluorescent or high pressure sodium fixtures for security lighting and consider motion sensors or photo cells to operate lights automatically.

Appliances

Appliance energy use is usually greatest for refrigerators, clothes washers and dryers, and dishwashers. Remember, the true cost of an appliance is the purchase price plus the cost for energy and water for operation. Providing a cheap, inefficient appliance will waste the money of low income families for years to come. Federal law requires that most appliances have Energy Guide tags that compare estimated operating costs between energy efficient and standard models.

ENERGY STAR® homes

To earn the ENERGY STAR, a home must meet guidelines for energy efficiency set by the U.S. Environmental Protection Agency. These homes are at least 15 percent more energy efficient than homes built to the 2004 International Residential Code (IRC), and include additional energy-saving features that typically make them 20–30 percent more efficient than standard homes. For more information, visit www.energystar.gov.

*Based on information provided by the Southface Energy Institute.
*Updated 07-2008